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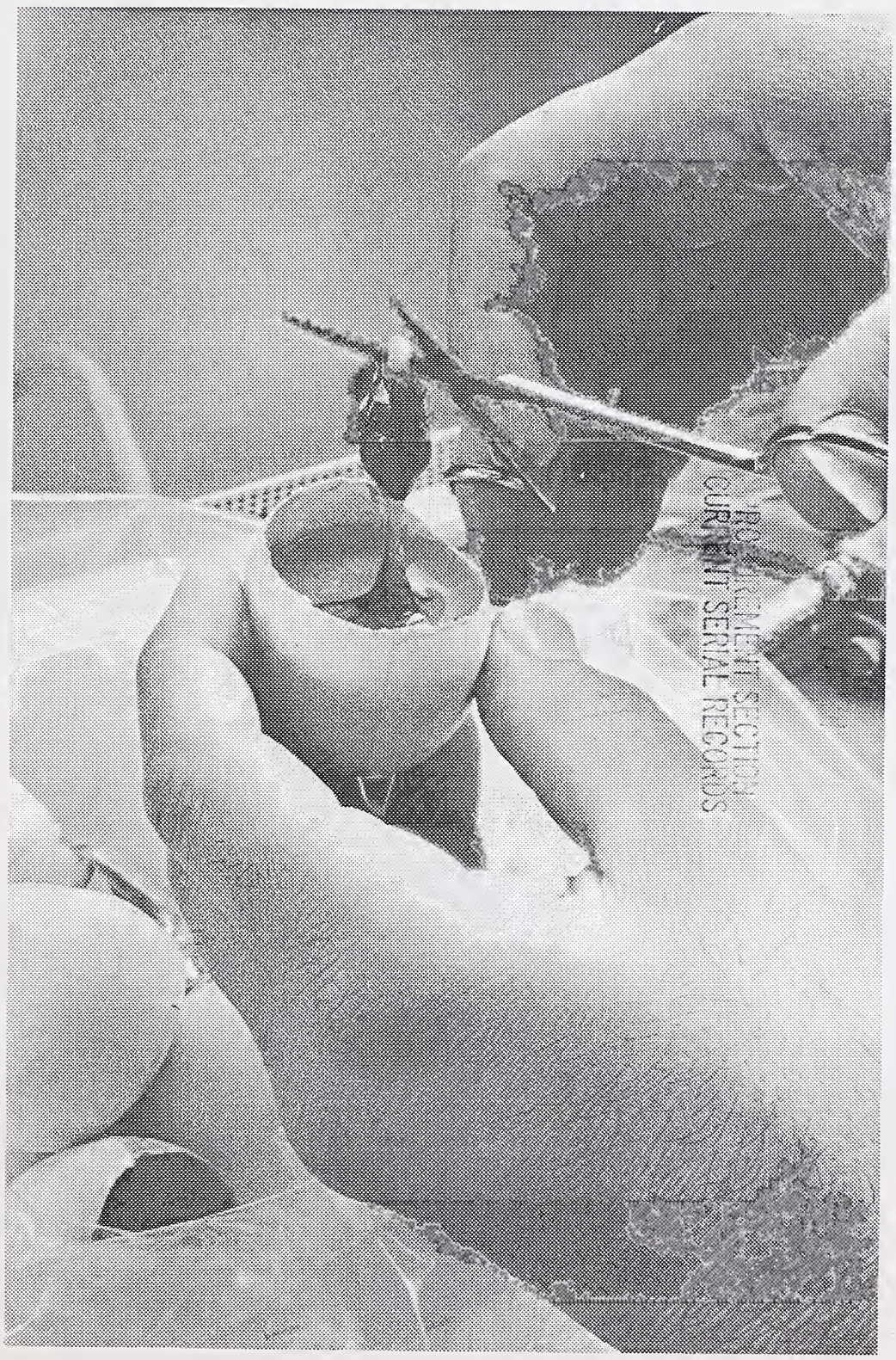
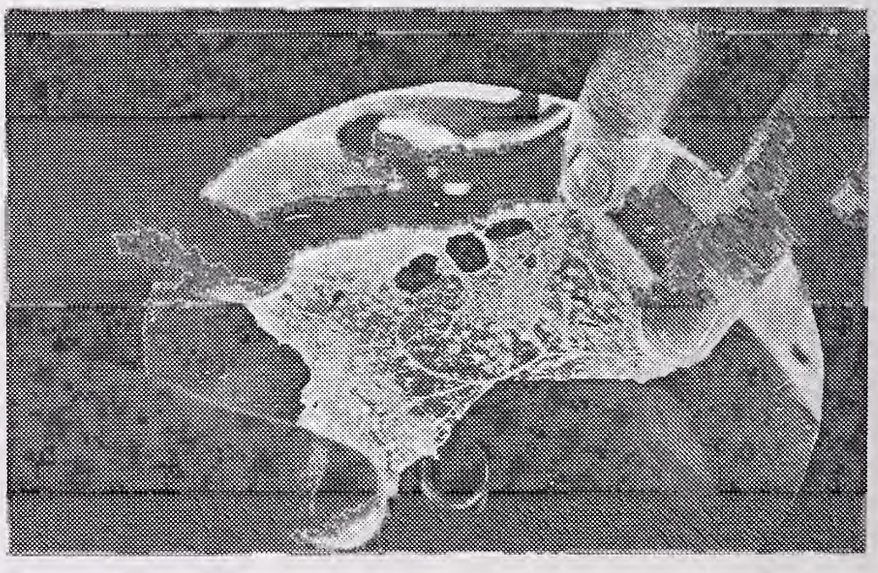
MAREK'S VACCINE on target



U.S. DEPARTMENT OF AGRICULTURE • AGRICULTURAL RESEARCH SERVICE

Upper left: One-day-old chicks are innoculated with herpesvirus vaccine by Dr. H. Graham Purchase. Pathogen-free, these birds will be raised in isolation until they are 3 weeks old. At that time, the effectiveness of the vaccine will be "challenged" by exposing the birds to Marek's disease. (0673A1226-25). Upper right: Microbiologist Elizabeth A. Hood inoculates the membrane that surrounds the embryos, called the chorioallantoic membrane, of 10-day-old embryos to determine their susceptibility or resistance to leukosis-sarcoma viruses. Geneticist H. A. Stone labels each egg with amount and type of virus inoculated. Fertilized eggs are from specific pathogen-free flocks maintained in isolation. (0673A1230-3).

Below: Light shining through a stretched choriollantoic membrane of an embryo reveals the number of lesions induced by inoculation with leukosis-sarcoma virus. This technique enables scientists to gather information that will help supply researchers with birds of particular genetic types. (0673A1228-7).



ON THE COVER:

Duck embryos are used extensively in Marek's disease research. Here, 13-day-old duck embryos are processed for fibroblasts—the cells that give rise to connective tissue—in preparation for growing turkey Herpesvirus as a vaccine. Scientists have learned that duck embryo cells make excellent growth media for both the virus causing Marek's disease, and the vaccine against the disease. (0673A1220-2).

The scourge of the poultry industry—Marek's disease of chickens—has been brought under control with a vaccine.

This vaccine, developed by scientists of USDA's Agricultural Research Service, was developed from a herpesvirus of turkeys, a member of a large family of viruses which also includes the Marek's disease virus.

The herpesvirus of turkeys (HVT) used as a vaccine is unusual because it naturally infects almost all turkeys, yet causes no disease. It is so closely related to Marek's disease virus that it protects chickens against this disease, yet can only be distinguished from Marek's disease virus by serologic procedures.

The HVT vaccine protects chickens from Marek's disease from as early as the day after hatching until the end of their productive life.

Marek's is a disease of the lymphoid cells. It strikes swiftly and takes a high toll, hitting mostly young broilers and layers. Losses have exceeded $200 million annually in previous years; it was the greatest cause of losses to the poultry industry.

ARS scientists estimate that the annual losses from Marek's disease have been reduced about 72 percent through the use of the vaccine, which is about 85 percent effective against the disease.

The ARS Regional Poultry Research Laboratory, East Lansing, Mich., was set up in 1939 to study avian leukosis. Scientists there began specific, intensive work on Marek's disease in 1967, when they and British researchers independently discovered that a DNA virus of the herpes group was the causative agent of Marek's disease.

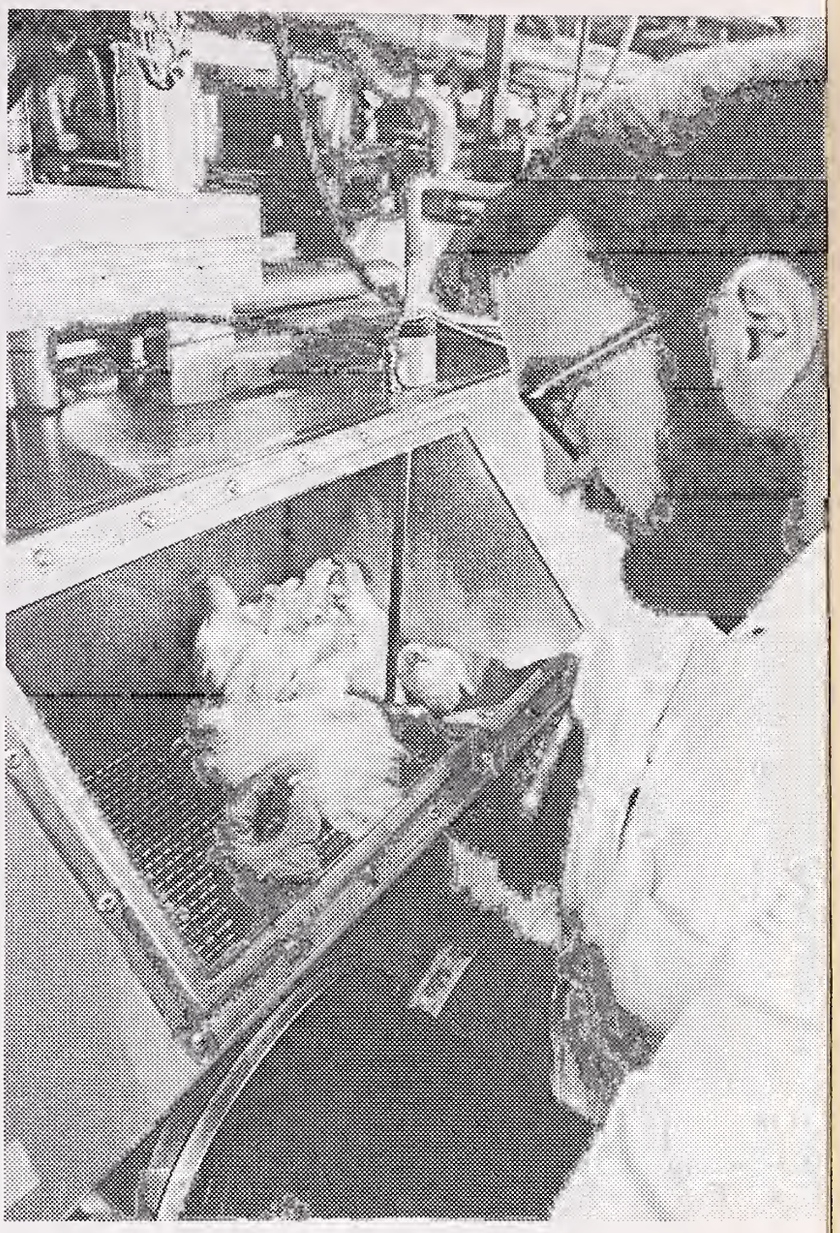
The discovery of the related, but innocuous, strain of herpesvirus in turkeys came in 1968, opening the way for the development of the HVT vaccine.

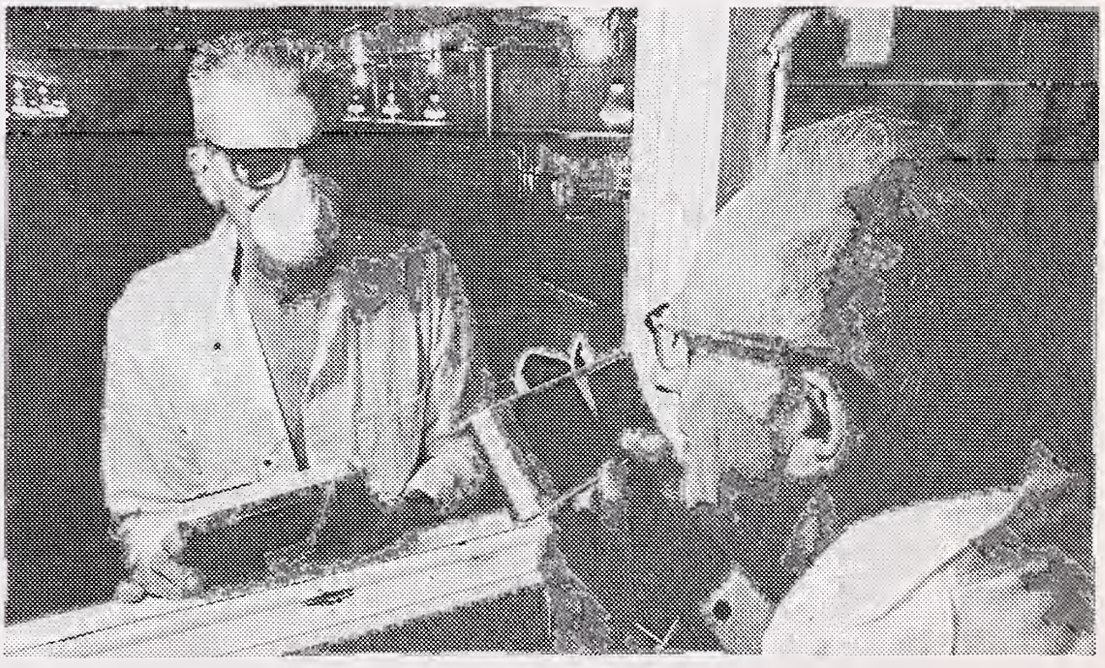
The HVT vaccine did not happen suddenly. Many thoughtful and precise research steps preceded the discovery. A team of internationally known scientists painstakingly initiated and followed 18 steps to the successful development of the vaccine. This type of research points the way for developing vaccines against human disease.

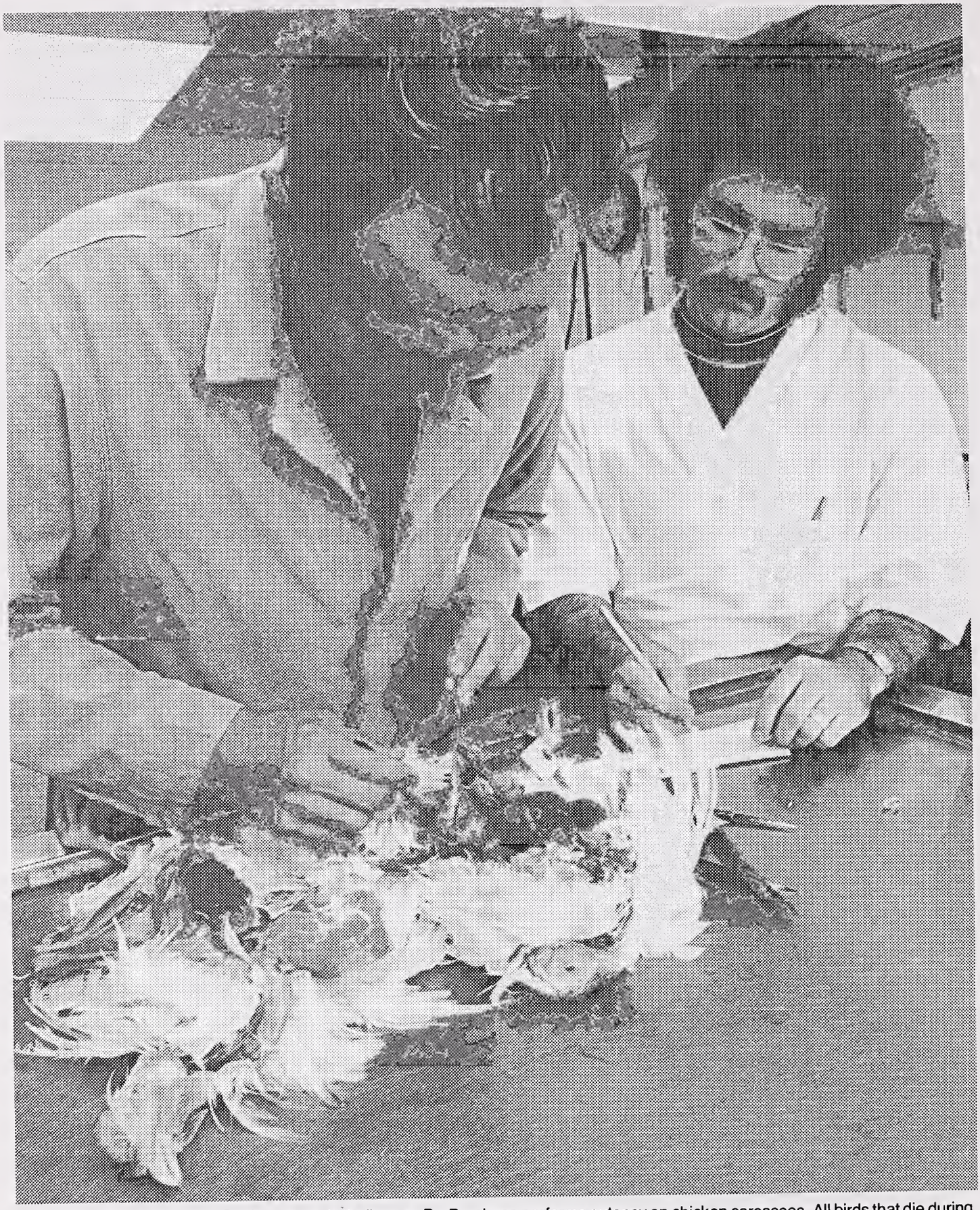
USDA Photographs by Murray Lemmon

ower left: Herpesvirus of turkey vaccine is mass produced at the boratory. Here, technicians Rolanda Watt and Maiga Gailitis observe ell growth on the surface of a roller bottle. The cells are prepared from 3-day-old duck embryo fibroblasts. (0673A1229-25). Lower right: asked against the respiratory transfer of disease organisms, techni-an Cecyl Ansley talks via two-way radio to Dr. Ben. R. Burmester, rector of the Laboratory, through the observation window of a thogen-free poultry rearing house at the Regional Poultry Research boratory. This facility is equipped with a positive air-pressure sys-m that virtually eliminates the possibility of infection through the troduction of air-borne particles. The system works by raising air essure inside the poultry house over that outside. In ordinary poultry ouses, birds contract disease from one another through air-borne rticles. This poultry house, however, has a filter system that re-oves 99 percent of any virus particles that may be present. Along th these safeguards, all persons entering the facility are required to ower and change into sterilized clothing. (0673A1221-6).

ve-week-old chickens in isolation are examined by geneticist How-d A. Stone. In purpose, the chambers are similar to incubators and so provide a safeguard against infection. Eggs are put into the ambers as 18-day-old embryos; after hatching they are banded to ow their specific genetic group, and the chicks are reared to the age six weeks. They are then transferred by portable isolation chambers larger isolation chambers where they produce fertile eggs for exper-ents. (0673A1222-14).







Laboratory technician Barry Coulson records findings as Dr. Purchase performs autopsy on chicken carcasses. All birds that die during an experiment are autopsied, as are those that have survived to the experiment's end. (0673A1227-15).

Residue from experiments is reduced to water, carbon dioxide and a small amount of ash in this new high-intensity incinerator designed to meet anti-pollution standards. (0673A1229-8).

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Dr. Burmester studies tissue culture of Marek's disease. (0673A1216-8).